Employment Effects of Alleviating Financing Frictions: Worker-level Evidence from a Loan Guarantee Program[†]

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September 3, 2019

Abstract

We document the impact on worker employment trajectories of a countercyclical loan guarantee program aiming at mitigating financing frictions for SMEs. Our identification strategy exploits plausibly exogenous heterogeneity in policy generosity between French regions, interacted with a geographical regression discontinuity design. We show that the guarantees result in a significantly higher likelihood of being employed over the seven years following the intervention, which translates into significantly higher cumulated earnings. The program benefits disproportionately high wage, male and younger workers, mostly driven by differences in retention decisions by the initial employer. We estimate the gross cost to preserve a job(-year) to be around €3,200, and a negative net cost when we include the savings on unemployment benefits.

Keywords: Loan Guarantees, Financial Frictions, Labor Market, Employment Trajectory.

JEL Codes: G28, G33, H81, J23, J31, J65

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1 Introduction

Numerous governments provide loan guarantee programs to facilitate bank lending to small firms. Such programs have been shown to foster employment growth at beneficiary firms (Brown and Earle, 2017). However, the overall impact of these programs on employment remains largely unknown given that the existing studies focus on *firms'* outcomes, thus ignoring workers' job-to-job mobility and their transitions between employment and unemployment. The literature is also mostly silent on whether such programs represent an effective countercyclical policy, and at which cost.

In this article, we use administrative data at the worker level and examine how exposure to a new loan guarantee program implemented in France during the 2008-2009 financial crisis affects the employment and earnings trajectories of workers over the medium run. At the micro level, this allows us to trace the employment trajectory of workers from affected firms, as well as understand who benefits the most from the program in the cross-section of workers. This exercise sheds light on both the effectiveness for employment of mitigating financial constraints and on the existing frictions in the labor market. At a more macro level, the data allows us to implement a cost-benefit analysis of the program that includes both the cost of guarantees and the savings associated with reduced unemployment insurance, which we can benchmark against the cost of other types of policy aiming at reducing unemployment.

The recovery loan guarantee program allows SMEs to rollover their short-term debt in the midst of the financial crisis, thereby mitigating their financial constraints in the short run. This new program was announced in the last quarter of the year 2008. As regional offices screen applications in a decentralized manner, we observe plausibly exogenous variation in the intensity of the program at the regional level. We exploit this heterogeneity and interact it with a regional border discontinuity approach in order to estimate the causal impact of the program on workers at firms benefitting from a guarantee. The identifying assumption is that workers in firms located on each side of the border would have experienced similar labor market outcomes in the absence of the loan guarantee program.

We first find strong evidence that the regional intensity of the loan guarantee program translates into a higher take-up of loan guarantees at the firm level. We then check that higher exposure to the program is indeed associated with an increase in the quantity of bank debt at the firm level. For this, we exploit balance-sheet data and find that firms in more exposed regions increase their quantity of bank debt relative to the counterfactual. We then leverage individual level administrative data to evaluate how this program affects the employment and earnings trajectories of workers until 2015. The granularity of our data allows us to decompose worker employment spells by firm, industry, and place of work and to examine variation in the impact of the policy according to firm and worker characteristics.

We find that the program has a significant and positive impact on workers' employment and earnings trajectories. Quantitatively, when extrapolating our estimates to the average treatment at the firm level, we find that the program is associated with an annualized increase of around 20% of workers' initial earnings over the period 2009-2015. This finding reflects mostly an employment margin: workers exposed to the program are significantly less likely to separate from their initial employer, and to be unemployed over the sample period. As a result, the total amount of unemployment benefits received by workers more exposed to the program are significantly lower. This result demonstrates both a cost saving dimension of this policy, and how the effect would have been even larger in terms of earnings in the absence of unemployment insurance. We conduct several empirical checks to support our assumption that regional exposure to the loan guarantee program on each side of the border is not correlated with other shocks affecting local economic outcomes. First, we find parallel trends in workers' earnings in the years prior to the year 2009. Second, the estimates are robust to the inclusion of regional controls for public debt, taxes, state contributions, and public investment during the crisis. Third, the estimates are only weakly affected when we control for firm-level observable characteristics, such as firm size and firm age, industry-fixed effects, and worker-level observable characteristics, such as age, occupation, and gender.

Given that we can match our worker-level data with firms' balance sheets, we can also

evaluate how the program differentially affects workers depending on firms' ex-ante financial constraints. Consistent with the idea that the program allows financially-constrained firms to access bank debt and avoid layoffs resulting from financial distress, we find a strong effect on workers' employment and earnings of financially-constrained firms, but virtually no effect for workers employed by unconstrained firms. This is mainly driven by the fact that unconstrained firms take-up does not seem to respond to regional differences in the intervention intensity.

Next we decompose the effect between firm retention policy and labor market frictions outside of the initial firm. We find that workers more exposed to the guarantee program are more likely to stay at their initial firm, and less likely to work at other firms. For workers being laid off, moving to another firm in the same industry appears to be the main margin of adjustment, which suggests the existence of industry-specific skills. We also find that workers adjust by moving to other firms outside their original commuting zone.

We then turn to the cross-section of workers and estimate heterogeneous treatment effects for separately high versus low wage workers, young versus old workers, and female versus male employees. Looking at the cross-section of workers, we observe that high wage, young workers, and men, benefit more from the intervention, as the effects on both cumulative earnings and employment are more pronounced for these sub-groups. When decomposing along the adjustment margins, this heterogeneity appears to result mostly from the retention decision of the firm initially employing the worker, rather than from differences in labor market frictions outside of the firm benefiting from the loan guarantee. Therefore the aforementioned sub-groups of workers benefit disproportionately from the program mostly because the program reduces the likelihood of separation from the initial employer compared to their counterparts.

We conclude the analysis by providing an aggregate cost-benefit analysis of the loan guarantee program. We find that the program had a positive impact on French aggregate employment on the order of around 210,000 jobs(-year), while the cost in terms of ex-

post default was around 0.7 billion euro. This corresponds to a gross cost to preserve a job(-year) of around €3,200. We also estimate savings for the unemployment national fund to be around €1.3 bn, as the loan guarantee program reduced workers' unemployment spells. This translates into a negative net cost for the policy when we include the savings on unemployment benefits. We also investigate whether the program might have the unintended consequence of reducing the reallocation of workers towards more productive jobs. However, we find no evidence that workers from the counterfactual appear to move towards higher productivity firms or start new firms.

Our research contributes to the literature on government programs and small business lending (Zia, 2008; Banerjee and Duflo, 2014; Bach, 2014; Ru, 2018), and loan guarantees in particular (Beck et al., 2010; de Andrade and Lucas, 2009; Lelarge et al., 2010; Mullins and Toro, 2016; Brown and Earle, 2017; D'Acunto et al., 2017; de Blasio et al., 2018), by shifting the focus from firm-level to worker-level outcomes. By estimating the difference in long-run outcomes between workers from exogenously treated firms to a relevant control group, our analysis identifies the causal effect of the loan guarantee program on the trajectories of individual workers' earnings and employment.

Second, our article contributes to the empirical debate on the effectiveness of public policies aiming to protect employment in crisis times, such as hiring credits (Cahuc et al., 2018a; Neumark and Grijalva, 2017), and subsidies for short-term work (Cahuc et al., 2018b; Giupponi and Landais, 2018). We show that loan guarantees have a positive impact on workers' employment and earnings, in particular for financially-constrained firms.

Our work also complements a large body of empirical studies estimating the employment effects of credit-supply shocks. Chodorow-Reich (2013) shows that firms with pre-crisis lending relationships with weaker banks face restrictions in credit supply and reductions in employment following the collapse of Lehman Brothers in 2008. Duygan-Bump et al. (2015), Greenstone et al. (2015) and Samuel Bentolila (2018) find that shocks to the supply of bank credit to (small) businesses during the Great Recession are associated with reductions in

employment. Recent studies (Fonseca and Van Doornik, 2019; Barbosa et al., 2019; Caggese et al., 2019; Baghai et al., 2019; Babina, 2019) use longitudinal linked-employer-employee data that allows to estimate the heterogeneous effect of financial shocks on the cross-section of individual workers.

Last, our article relates to a large literature on the long-run consequences of job loss or job market entry timing, starting with the seminal study of Jacobson et al. (1993) (Couch and Placzek, 2010; Davis and Wachter, 2011; Autor et al., 2014; Lachowska et al., 2017; Yagan, 2018). Workers graduating in a recession earn persistently less than those graduating nearby peaks (Kahn, 2010; Oreopoulos et al., 2012). We build on this literature and our contribution is to focus specifically on the long-term effects on worker outcomes of alleviating firms' financial frictions.

Our study proceeds as follows: In section 2, we provide institutional detail on loan guarantee programs and specifically on the French one. In section 3, we describe the data we use and detail the identification strategy we implement to establish a causal effect. Section 4 provides our baseline results at the micro level while section 5 decomposes the effects into firm retention decisions and labor market frictions and examines heterogeneity in the consequences of the program by individual characteristics. Section 6 assesses direct and indirect costs of the program and develops a cost-benefit analysis at the macro level. Section 7 concludes.

2 Institutional Background

2.1 Public Loan Guarantee Programs

Numerous governments, including the US, provide loan guarantees to small firms. These programs are usually implemented through a specialized entity, such as the Small Business Administration (SBA) in the US or Bpifrance in France, which partners with banks. In 2017, the amount of new loans guaranteed respectively by the SBA and Bpifrance was around USD

25 billion in the US, and around USD 4.5 billion in France.

The economic rationale for such programs is typically threefold: mitigating financing frictions specific to small businesses, fostering economic activity that creates positive externalities, and alleviating firm behavior that can create negative externalities. Access to credit for small firms might be limited by adverse selection (Stiglitz and Weiss, 1981), moral hazard (Holmstrom and Tirole, 1997), and transaction costs. Positive externalities from small firms typically include innovation and offering job opportunities in peripheral areas. On the contrary, layoffs might generate negative externalities when frictions on the labor market prevent the efficient reallocation of the workforce.

Loan guarantees by a government-backed entity have several advantages over direct public lending. First, this public intervention design facilitates the delegation of screening and monitoring to private banks. Relying on banks' expertise and infrastructure mitigates the risk for political considerations to drive the allocation of credit. As the guarantees are partial, banks retain skin in the game when screening loans, which limits moral hazard on the side of the banks. A last advantage of the guarantee design is that it does not require the guarantor institution to disburse cash and raise capital, although it has to hold regulatory capital.

One potential limitation of credit guarantee schemes is that they might attract riskier borrowers and worsen the pool of firms accessing external financing. They might also deteriorate banks incentives to properly monitor borrowers in the presence of moral hazard.

2.2 The French Public Guarantor: Bpifrance

Bpifrance is the entity managing public loan guarantee programs in France. Bpifrance (previously named Sofaris, and then Oseo-Garantie) was created in 1982 as a French equivalent of the SBA. Bpifrance is a government-backed entity, whose two shareholders are the French State and the *Caisse des Depots et Consignations* - the long term investing arm of the French government - and aims at financing companies from seed phase to maturity. Bpifrance activities are therefore mostly targeted towards SMEs and encompass investing in equity (VC

and Private Equity), lending, extending loan guarantees, and providing grants.[1] Bpifrance does not collect deposits, but funds itself in the wholesale market.

Bpifrance works with a network of partner banks that include all major French banks, and relies on them to source loan applications. As of 2017, Bpifrance possesses 48 local branches that process the loan guarantee applications provided by the banks.

In the remainder of the paper, we focus on a new loan guarantee program created at the end of the year 2008, which specifically aims at allowing firms to rollover their short-term debt during the credit crunch.

2.3 The Recovery Plan

The French recovery plan of 2009-2010 led to the creation of a large short-term credit guarantee program managed by Bpifrance (under the Oseo-Garantie name at that time). The plan guaranteed €5.3bn of new bank debt between 2008Q4 and 2010Q4, which represents 0.2% of the GDP of France and half of the total guarantees granted by Bpifrance over the same period. The plan targeted new lines of credit with a term between 12 and 18 months, as well as the restructuring of existing short-term debt into new loans with maturity between 2 and 7 years. 4,000 firms received guarantees on their new lines of credit for an amount of €1.8 bn, and 17,000 firms received guarantees on their medium-term new loans for an amount of €3.5 bn. A guarantee extended by Bpifrance covers between 50 and 90% of a loan notional. Bpifrance charges on average an insurance premium of around 1% per annum in exchange for such a guarantee. This cost to the issuer needs to be compared to the ex post default rate: around 10% of recipients failed as of June 2011, which implies that the guarantee was heavily subsidized on average.

[INSERT FIGURE 1]

[1] Bpifrance also has an activity of funds of funds to support the VC industry.

3 Empirical Strategy

3.1 Data

We use three complementary sources of data, which we obtain from Bpifrance and the French Statistical Office (INSEE): an exhaustive file of individual loan guarantees, the exhaustive firm registry, and a matched worker-firm panel covering 1/12th of the French workforce.

3.1.1 Loan Guarantees

We use proprietary data provided by Bpifrance on the whole universe of firms benefiting from loan guarantee programs since 2002. This data provides a unique firm identifier (SIREN), and information on the guarantee characteristics, including the date and amount of the intervention, whether the guarantee was part of the recovery plan, the type of loan underlying the guarantee, and the fraction of the loan covered by the guarantee. The Bpifrance data does not include information on interest rates. The data include information on default: whether the loan benefiting from the guarantee defaults over its life, and the loss amount.

3.1.2 Firm-level tax filings

We use administrative microdata extracted from tax files used by the French Ministry of Finance for corporate tax collection purposes, available until 2015. The data includes the balance sheets and profit and loss statements of the universe of French firms. The data is not publicly available, but is available for academic research through a procedure similar to accessing Census data in the US. We track firms through time with their unique identifying number ascribed by the French Statistical Office (INSEE). We retrieve industry classification using a historical four-digit industry classification code ascribed to each firm by the French Statistical Office itself, which is similar to the SIC coding system in the US. We exclude financial and real estate sectors, as well as utilities, non-profit, and regulated sectors. Unfortunately, there has been a discontinuity in the number of firm-level variables available

for researchers in 2010. For the purpose of our analysis, this means that we observe bank debt only until 2009. This is unfortunate as one part of our analysis is to check whether the loan guarantee program indeed allowed exposed firms to borrow from banks. For our balance-sheet analysis, this implies that we can only estimate the effect of the program on the change in bank loans between 2008 and 2009.

3.1.3 Worker-level data

Last, we rely on matched worker-firm longitudinal data ("DADS Panel"), built by the French Statistical Office (INSEE) from social security contribution declarations of firms. The sample covers all individuals born in October of each year, i.e. 1/12th of the French workforce. Each year firms declare the employment spells, the number of hours worked, and the associated wages for each worker. The DADS files cover virtually all French wage earners from 2009, except for self-employed workers, if they do not pay themselves a wage.[2] For workers who have multiple jobs in a given year, we aggregate earnings across all jobs and retain the identifier of the employer that accounted for the largest share of the worker's earnings. Data on unemployment benefits are available since 2008, and there is no information on other forms of government benefits.

3.2 Data Filtering

We apply the following filters at the firm and individual level. At the firm level, we first restrict the sample to non-financial SMEs (defined as firms with less than 250 employees) in the for-profit private sector. SMEs represent virtually all the beneficiaries from the recovery plan. Second, for the purpose of our identification strategy, we restrict the firm sample to firms with all their employees in the same region and located within a 10 miles distance to a regional border.

[2]Civil servants from the French central, regional and local administrations (general government), workers from the public health care sector, and workers employed by households (e.g. for house-keeping or child care) are not covered prior to 2009.

At the worker level, we restrict the sample to workers with high labor force attachment (as e.g. in Autor et al. (2014); Yagan (2018)), in our case workers with earnings above €10,000 in each year 2006, 2007 and 2008. We then focus on workers who were born between 1957 and 1984 and study their outcomes over the period 2008-2015, during which these individuals were between 24 and 58 years old. We finally restrict our analysis to French citizens in order to minimize unobserved employment in foreign countries.

3.3 Descriptive Statistics

Table 1 presents descriptive statistics for the data obtained after filtering.

Panel A provides information on the exposure to the loan guarantee program, both at the regional and firm level. $Guarantee_{region,2009-2010}$ corresponds to the sum of the loan guarantee amount under the recovery plan in a given region, divided by the sum of the assets of all firms eligible to the program in this region, computed excluding the firms within 10 miles of a regional border. On average, the program represented 0.28% of total firm assets in a given region. The generosity of the program however appears to vary significantly across regions, with firms from the least generous region having received 0.1% of the total firm assets in guarantee, while firms from the most generous region received 7.5 times more.

Turning to the treatment at the firm level, we observe that 4% of the firms in our sample received a loan guarantee. The average treatment conditional on being treated is therefore equal to the average treatment at the firm level (0.28% of total firm assets) divided by 4%, e.g. 7% of the firm's assets.

The worker sample consists of 38,024 individual workers employed full time in 2008 in a firm located within a 10 miles distance to a regional border. The average worker worked for 6.5 years during the 2009-2015 period, and received earnings equal to 6.5 times their initial annual earnings, including 0.2 times their initial annual earnings in unemployment benefits. The average worker is 38 years old, works 1,868 hours and earns €23,630. per year

We also present a number of firm characteristics measured in 2008. The average firm has

20 employees in 2008, is 18 years old, has assets of €3.3 million, return over assets of 10%, and bank debt representing 15% of its assets.

[INSERT TABLE 1]

3.4 Empirical Design

3.4.1 Setting

Studying the effects of a loan guarantee program faces an immediate empirical challenge: the obtention of a loan guarantee is most likely correlated with firm characteristics, either observables or unobservables. A naive OLS regression of worker outcomes on firm-level guarantee treatment is therefore prone to suffer from endogeneity, most likely a selection of treated firms on distress.

For the purpose of causal identification, we exploit plausibly exogenous variation of loan guarantee volumes at the regional level, interacted with a geographical regression discontinuity design that allows to absorb local economic conditions. Specifically, we predict firms' exposure to the loan guarantee program on each side of regional borders with the average treatment intensity of other firms in the same region.

For this purpose, we obtain the longitude and latitude coordinates of the centroid of each municipality. Using these geographic coordinates, we calculate the minimum distance from the population centroid of the municipality to the regional border. Figure 2 illustrates all the municipalities that are within 10 miles of the border, that is, the municipalities for which the minimum distance from the population centroid of the municipality to the regional border is below 10 miles. These municipalities form a strip of land on both sides of the border of fairly uniform width. Our baseline sample includes all workers working in a firm located in one of these border municipalities.

Figure 2 also displays the treatment intensity at the regional level – that is, the average of total volume of loan guarantees divided by the total value of firm assets in 2008 for each

region, previously described in table 1. Our empirical strategy exploits this regional variation in treatment intensity as source of identification.

[INSERT FIGURE 2]

3.4.2 Specifications

Our empirical strategy is akin to a difference-in-difference estimation where areas are differentially exposed to the short-term loan guarantee program. The exclusion restriction relies on the regional loan guarantee exposure only affecting workers' outcomes through the subsidized access to new lines of credit and bank loans offered by the program to their employers in 2009 and 2010. In particular, regional exposure to the program needs to be orthogonal to other local shocks that would otherwise affect workers. This motivates our regional discontinuity approach which largely mitigates the possibility that unobserved local economic shocks might confound our findings.

Our first stage boils down to the following cross-sectional regression:

$$Guarantee_{firm,2009-2010} = \beta.Guarantee_{region,2009-2010} + \delta.X_f + \delta_2.X_w + \delta_3.X_r + \gamma_s + \epsilon_f, \quad (3.1)$$

where $Guarantee_{firm,2009-2010}$ is the ratio of the amount of loan guarantee received by firm f from Bpifrance through the recovery plan over the firm total assets in 2008, $Guarantee_{region,2009-2010}$ is the average of the ratio of loan guarantees under the recovery plan over total assets in region r, X_f is a vector of firm characteristics, and includes the logarithm of firms' total assets in 2008, the logarithm of firm age in 2008, as well as industry fixed effects (for 56 2-digit industries), and γ_s are department-pair fixed effects (a finer geographic division than regions). We cluster the error term, ϵ_f, at the level of regions. We run this regression both at the firm and at the worker level, to ensure both robustness and specification consistency. When running this regression at the worker level, we include X_w, a vector of worker characteristics including worker age, gender, and occupation fixed effects

all measured in 2008, as additional controls.

We then estimate a similar cross-sectional specification as 3.1 with employment and earnings outcomes at the worker level as dependent variables:

$$y_{i,2009-2015} = \beta.Guarantee_{r,2009-2010} + \delta_1.X_f + \delta_2.X_w + \delta_3.X_r + \gamma_s + \epsilon_f, \tag{3.2}$$

where y denotes an employment or related outcome over our sample period 2009-2015. Following Autor et al. (2014) and Yagan (2018), one of our main variables of interest – cumulative earnings – are normalized by workers' initial earnings, that is, over the period 2006-2008. β, our coefficient of interest, measures the causal effect of initial regional exposure to the loan guarantee program on workers' outcomes. Importantly, we control for local economic conditions with department-pair fixed effects, which means that our identification comes from within (short) sections of the border band we study.

The main identifying assumption is that firms, and their workers, are as good as randomly assigned on one side of the border, meaning that workers in firms located on each side of the border would have experienced similar labor market outcomes in the absence of treatment. We first note that if labor markets are frictionless and workers can change their region of employment and obtain identical compensation in alternative firms, we should see no earnings or employment impact at the worker level from differences in their regional exposure to the French loan guarantee program in the period 2009-2010.

We then check that workers and firms are almost indistinguishable based on observables on each side of regional borders in the year before the implementation of the loan guarantee program. For this, we run the same cross-sectional specification as 3.1 with workers' and firms' outcomes as dependent variables, all measured in 2008. We present the results in Appendix Table A.4. The differences in workers' earnings, hours worked, unemployment benefits (Panel A), as well as firm age, firm size, and firm return on assets (Panel B), all measured in 2008, between low and high exposed regions are all small and statistically insignificant.

A potential concern is that the variation in intervention exposure we exploit might correlate with other local shocks that affect workers' employment and earnings. We address this concern in two ways. First, we show that workers' earnings prior to the intervention are uncorrelated with the subsequent regional intensity of the guarantee program, which mitigates concerns over reverse causality and omitted variable bias. Still, variation in the regional treatment intensity during the crisis years 2008Q4-2010Q4 might coincide with other regional shocks happening at the same time, for instance other regional government spending. We therefore include in all our regressions a series of controls that capture changes in public spending at the regional level, X_r. Specifically, we include the regional 2008-10 per-capita change in public debt, state contributions, local public investment, and taxes, respectively.

We also turn to longitudinal linked-employer-employee data in order to control for cross-area sorting. The longitudinal component allows us to measure individuals' employment over time regardless of whether and where in France they migrated. The linked-employer-employee component allows us to control for workers' age, gender, and occupation.

3.5 First-Stage Evidence

3.5.1 Predicting Firm-level Intervention using Regional Volume of Guarantees

We start by establishing the internal validity of our empirical setting. Table 2 displays the regression coefficients of the first stage as described in equation 3.1, at the firm level. In columns 1 to 3, the coefficients on $Guarantee_{region,2009-2010}$ are significant and positive, which confirms that a higher intensity of intervention in a given region translates into a higher intensity of intervention for firms close to the regional borders. We progressively introduce regional, and firm level controls, which leaves the coefficient of interest mostly unchanged. The coefficient of interest is around 0.6, which suggests that the intensity of intervention is comparable in the border area to the rest of the region, with a slight attenuation. Columns 4 to 6, where the dependent variable is an indicator variable for receiving a guarantee, illustrates that the regional intensity is associated with a significantly higher

likelihood of receiving a guarantee. Regression results at the worker level are qualitatively and quantitatively consistent, and are reported in table A.5 of the online appendix.

[INSERT TABLE 2]

3.5.2 Balance-Sheet Evidence: Loan Guarantees and the Maturity of Debt

To further strengthen the validity of our first stage, we study whether regional variation in the intervention is associated with the balance sheet effects aimed for by the program and expected from a relaxation of the financial constraint, namely a better access to bank debt. We indeed find that a higher regional exposure to the loan guarantee program is associated with a higher growth in bank debt on firms' balance sheets relative to firms from the counterfactual.

For this, we run a specification similar to our first stage where the dependent variable is the growth rate of bank loans over 2008-2009, and the explanatory variable is the regional total amount of guarantee over total firm assets for the year 2009 only. Due to data constraints, we can only observe the debt composition of firms until the end of 2009, and therefore can only measure the effect on bank debt of the first year of the program. Table 3 displays the regression coefficients. Higher exposure to the loan guarantee program is indeed associated with an increase in bank loans on firms' balance sheets. This result is robust to using total debt growth rate over 2008-2010 as a dependent variable and $Guarantee_{region,2009-2010}$ as the explanatory variable, which covers the whole treatment period, but does not zoom in on the part of debt directly affected by the program.

[INSERT TABLE 3]

4 Impact of Loan Guarantees on Employment and Earnings

We begin by examining the impact of exposure to the loan guarantee program on workers' employment and earnings.

4.1 Baseline

We run our baseline specification to study the causal impact of this program on worker employment trajectories. Coefficients are displayed in table 4. Panel A studies cumulative effects over the period 2009-2015, whereas panel B explores the 2015 snapshot. Columns 1 and 5 include only department-pair fixed effects. We progressively add regional controls in columns 2 and 6, firm-level controls in columns 3 and 7, and worker-level controls in columns 4 and 8.

The results illustrate how workers at firms more exposed to the loan guarantee program consistently fair better on both the extensive margin and the intensive margin of employment. We find a positive and statistically significant relation between workers' exposure to the loan guarantee program in 2009-2010, and their average cumulative employment and earnings over the period 2009-2015. First, as shown in columns 1 to 4, higher exposure to the program increases workers' employment rates over the period. Second, more exposed workers receive significantly higher cumulative earnings over 2009-2015.

The effects are economically sizable. Relative to the pre-crisis period, workers from a region with the average treatment experience a total gain in cumulative earnings over the period 2009-2015 of at least 6 percentage points of their initial annual earnings, e.g. around 1% per year, when compared to a hypothetical region with no exposure to the program.[3] The coefficient of interest remains stable across the specifications when progressively adding the controls. When extrapolating this point estimate to the average treatment at the firm level

[3]The average regional treatment is equal to 0.28% of total firm assets, which we multiply by the most conservative point estimate of our regression, 22%.

conditional on obtaining a loan guarantee, it translates into additional cumulative earnings for workers of the average treated firm of 1.4 times their initial annual income, over the 7 year period since the beginning of the program for employees of firms receiving the average treatment. When scaled per year, this corresponds to 20% higher earnings per year for workers at a firm receiving the average treatment, which illustrates the large magnitude of the effect.

In addition to their magnitude, the effects of the loan guarantee program appear to be persistent. In the 2015 snapshot displayed in Panel B, i.e. 7 years after the beginning of the program, the likelihood of employment appears to be still significantly higher for workers initially employed in firms more exposed to the loan guarantee program.This persistence, 7 years after the beginning of the program, speaks to the long shadow of the earning losses that financial frictions can impose on workers when they are not mitigated.

[INSERT TABLE 4]

In table 5, we run a similar specification using an indicator variable for the worker not being employed at the firm where they were working in 2008 as of 2015. The likelihood of separation appears to be significantly lower for workers initially employed in firms more exposed to the loan guarantee program. Comparing the coefficient in column 4 of Table 5 with column 4 in Panel B of table 4 is indicative of the fraction of separated workers from their initial employer that are still not employed versus those who work for another employer as of 2015, a reallocation mechanism that we study in more detail in section 5.

4.2 Effect on Welfare Benefits

In France, earning losses due to involuntary unemployment are partly mitigated by unemployment insurance for a period up to two years. Unemployment benefits cover a fraction of the initial wage, and are subject to eligibility criteria. In our dataset, we can isolate earnings coming from unemployment benefits, which allows us to both estimate what the earning

effects would have been for workers in the absence of unemployment insurance, as well as estimate the savings in unemployment benefits for the government that result from offering loan guarantees. We measure the effect of the intervention on worker unemployment benefits by using years and amount of unemployment benefits during 2009-2015 as the dependent variable in our baseline specification. Results are displayed in table 6.

Workers from treated firms obtain unemployment insurance for a significantly shorter period of time, and collect significantly lower cumulated amounts of unemployment benefits over the period. In economic terms, the total amount of unemployment benefits received by workers in regions with average treatment intensity is lower by 2 percentage points of their initial earnings than for non-treated regions. This point estimate indicates that in the absence of unemployment insurance, the differential between the two groups would have been one third larger. This finding is consistent with the effect on employment we document, and is of first order importance for the net cost of the intervention that we estimate in Section 6.

[INSERT TABLE 6]

4.3 Dynamics

Studying the dynamics of the effect speaks to the speed of the impact of the loan guarantee program on employment, its persistence, and absence of pre-trends that strengthen the causal interpretation.

In Figure 4, we plot the estimated effect of exposure to the loan guarantee program on worker earnings for each year from 2009 to 2015. Exposure to the loan guarantee program appears to have a strong and immediate beneficial effect on workers' earnings, which remains stable over time, although the effects is less precisely estimated as other factors increasingly play a role.

[INSERT FIGURE 4 AND FIGURE 5]

We present additional point estimates on the dynamic effects of the intervention in table 7, which displays the yearly effect of loan guarantees on worker earnings (Panel A), and the cumulative effect over time for both earnings (Panel B) and unemployment insurance (Panel C). As shown in Panel A, exposure to the loan guarantee program is associated with a large and statistically significant effect on annual earnings in each year from 2009 to 2015. This trajectory also means that 7 years after the beginning of the program, untreated workers have still yet to start catching up with the ones that were more exposed to the loan guarantee program. Reassuringly, the coefficients for the year 2004 to 2009 are all insignificant, which supports the absence of pre-trends and a causal effect being at play. As earnings are significantly higher post treatment, the cumulative effect on earnings keeps growing over that period, as exhibited in panel B. The same dynamic is at play for cumulative unemployment benefits, even though the effect stabilizes, as would be expected from the limited time eligibility of unemployment benefits.[4]

[INSERT TABLE 7]

4.4 Firm Heterogeneity and Robustness

We now turn to the heterogeneity of the effect and split our sample along proxies for firm financial constraints. We run our baseline specification on each of these sub-samples and present the regression results in table 8. In Panel A we use the number of years employed as dependent variable, while using cumulative earnings in Panel B. To robustly capture the degree of financial constraints a firm faces, we use the three proxies for financial constraints most widely used in the literature to split our sample: having low cash flows in columns 1 and 2, not paying dividends in columns 3 and 4, and having a low share of tangible assets that can be used as collateral in columns 7 and 8.[5] Columns 3, 6 and 9 test for the statistical

[4]Unfortunately, we cannot test for the presence of pre-trends for unemployment benefits, given that the required data are available in the employment registers only from 2008.

[5]See Fazzari et al. (1988) for an early application of this methodology and Almeida et al. (2004), and Chaney et al. (2012) for recent examples.

significance of the difference in the coefficients on $Guarantee_{region,2009-2010}$ between the subsamples.

Consistent with the notion that the loan guarantee program mitigates SMEs financial frictions, the effects on workers employment and earnings we document are more pronounced for firms with low cash flows, low-collateral firms, and firms not paying dividends, all measured in 2008.[6] The difference between the coefficients is particularly pronounced between the firms with low versus high cash flows.

[INSERT TABLE 8]

We also conduct a set of robustness tests on our baseline specification, which we report in table A.6 of the online appendix. First, we ensure that our results are robust to our definition of a regional border area. We use a cutoff of 5 miles instead of 10 miles from the regional border for defining a border area, and find consistent results, even though the size of the sample substantially drops. Second, we address the concern that our result might be picking up a different economic trend between Paris and its surrounding area, and the rest of France. To do so, we exclude the region $Ile-de-France$, the region that includes Paris and its suburbs, from our analysis. Again, our coefficients are virtually unchanged. Third, one may be concerned that the program distorts competition on product markets in favor of firms from the regions more exposed to the guarantee program. Under this hypothesis, our coefficients would also reflect the reallocation of labor from losers to winners on the product market on each side of the regional borders. We address this concern by removing non-tradable industries from our sample (e.g. restaurants), where demand effects through local competition could indeed confound our estimates. Reassuringly, our baseline results are quantitatively comparable when we restrict the sample to tradable industries only.

[6]By running the first stage along the same dimensions of firm heterogeneity, we observe that the more pronounced effect for financially constrained firms is driven by their higher take-up of the program. Results are displayed in table A.8 in the online appendix.

5 Tracing Down Labor Market Frictions

Having established the causal effect of the loan guarantee program on worker employment and earnings, we turn to decomposing the effect between firm retention policy and labor market frictions outside of the initial firm; and whether firm retention policy and labor market frictions vary with worker characteristics.

5.1 Adjustment Margins

We follow Autor et al. (2014) to disentangle firm retention decisions from labor market frictions by pinning down the adjustment margins of employment in table 9. We isolate from the overall effect on years employed and cumulated earnings displayed in column 1, which corresponds to the results from table 4, the share coming from the firm in which the worker is initially employed as of 2008 in column 2, and from other firms in column 3. We further flesh out the adjustment coming from employment in other firms by area in columns 4 and 5, and by industry in columns 6 and 7.

This exercise allows us to isolate the effect the intervention would have had if there were no margins of adjustment for workers becoming unemployed (the point estimate of column 2), and to identify the main dimensions of adjustment for workers whose firms did not benefit from the intervention. For the margin of adjustment, a negative coefficient should be interpreted as a higher reallocation of workers to this destination in the counterfactual than in the treated group.

We find that workers from firms more exposed to the guarantee program work longer at their initial firm, and receive more in total earnings from their initial firm than the control group, which is consistent with a higher retention from treated firms. Symmetrically, they work less at other firms and receive less earnings from other firms over the sample period. For workers being laid off, moving to another firm in the same industry appears to be the main margin of adjustment in the counterfactual, which suggests the existence of industry-

specific skills among the workers. We also find evidence for geographic reallocation: workers appear to adjust by moving to other firms outside their original commuting zone.

[INSERT TABLE 9]

5.2 Worker-level heterogeneity

Next, we explore the heterogeneity in the main effect and in adjustment margins according to worker characteristics: low vs. high wage workers, age, and gender. This heterogeneity analysis allows to identify which groups of workers benefit the most from the program, and whether these differences come from firm retention policies or labor market frictions.

In the three panels of table 10, we compare the impact of exposure to the loan guarantee program on employment and earnings separately for below and above median wage workers in panel A, young and old workers in panel B, and men and women in panel C. We first measure the main effect for each sub-group in columns 1 and 3, and then flesh out the component coming from the initial employer of the worker in columns 2 and 4. We test for the statistical significance of the difference between the two sub-groups in columns 5 and 6.

Looking first at the overall effect in column 1, 3 and 5, we observe that workers with higher wages, younger workers, and male workers, seem to benefit more from the intervention overall, as the effects on years of employment and particularly on cumulative earnings are statistically higher for these sub-groups.

We also observe that for high wage, young, and male workers, the overall effects in column 3 on earnings are larger than the effects on employment. This suggests that these sub-groups of workers either accept lower wages or work less hours in order to find a new job after getting fired.

When focusing on the effect coming from the initial employer, we find much larger effects for high wage, young and male workers, suggesting that the difference in the overall effect is mainly driven by firm's retention decisions. Indeed, the differences in column 5 and 6 are quantitatively comparable for wages and age. However, for gender we observe a more

pronounced difference stemming from the initial firm. This result suggests that men disproportionately benefit from the increase in retention associated with the guarantee program, but that this difference is attenuated as men are more likely to compensate with earnings at other firms.

[INSERT TABLE 10]

Next we study the persistence of the effects across the sub-groups of workers. Table 11 shows the results for employment, hours worked and earnings in 2015. High wage, young and male workers exhibit significantly stronger effects on employment, hours worked and in particular earnings even in 2015, 7 years after the launch of the program. Further, the effects on hours and earnings are similar and larger than the effects on employment, suggesting that indeed these sub-groups earn less if they find a new job because they work less hours.

[INSERT TABLE 11]

Overall, our results in the cross-section of workers provide evidence on the distributional consequences of loan guarantee programs. We also document that most of the cross-sectional variation stems from differences in retention probabilities rather than mobility patterns and the effects persist 7 years after the program was initiated.

6 Assessing the Costs of the Program

While the previous section documents the benefits of the loan guarantee program in terms of employment for the workers and savings in welfare payments for the government, these benefits need to be contrasted with the cost of the program to assess the efficiency of this public policy.

6.1 Direct Cost: Increased Credit Risk

The direct cost of the loan program is the financial cost associated with bearing the credit risk of borrowers. Figure 3 shows the likelihood of receiving a loan guarantee under the recovery plan as a function of credit risk, measured by the interest coverage ratio. The figure shows that the probability of receiving a loan guarantee is higher for higher levels of credit risk, except for the top decile. Thus, BPI appears to predominantly guarantee loans to risky firms, in line with the program's intention, while avoiding the riskiest. With this in mind, we estimate how much an expansion in the recovery plan leads to a deterioration of borrower's quality. For this, we regress a firm's credit risk decile in 2008 on our measure of regional treatment intensity. Table 12 shows the results for both the sample of firms receiving a guarantee under the recovery plan in columns 1 to 3 and for all firms in our sample in columns 4 to 6.

When looking at the sample of firms receiving a guarantee, we find that firms from a region with the average treatment exhibit 0.3 to 0.4 points higher credit risk deciles in 2008, when compared to a hypothetical region with no exposure to the program. Thus, regions with higher treatment intensity appear to extend loan guarantees to riskier borrowers. In contrast, we do not find statistically significant effects when we look at our entire sample. The magnitudes of the point estimates suggest that the average credit risk decile is 0.05 points higher in regions with the average treatment, compared to a hypothetical region with no treatment. These results show that regions with higher treatment intensity are not populated by more risky firms in general. Rather, regions with higher treatment intensity appear to extend loan guarantees to increasingly risky borrowers in order to spend their budget.

[INSERT TABLE 12]

6.2 Indirect Cost: Preventing Efficient Re-allocation of Workers?

A potential indirect cost of the loan guarantee program is that it might prevent an efficient reallocation of workers, from firms in distress to more productive or new firms. As our data allows to track a worker even when she/he changes job, we can observe to which type of firms workers get reallocated in our counterfactual. In table 13, we study the worker employment outcome at other firms for the treated group versus the counterfactual. We find negative coefficients on our treatment variable for employment and earnings at low cash flow firms, which means that workers from the counterfactual are more likely to move to this type of firms. We do not find much differences along the firm age dimension, nor on firm creation. These results suggest that workers whose displacement is not prevented by the loan guarantee program are not particularly likely to move to highly productive or new firms. This result is hard to reconcile with the hypothesis that the loan guarantee program acts as a barrier to efficient allocation of workers in the economy, and therefore mitigates concern over this potential indirect cost of the program.

[INSERT TABLE 13]

6.3 Cost per Job(-year) at the Aggregate Level

Moving to the macro level, we perform an aggregate cost-benefit analysis of the loan guarantee program. As our analysis is conducted at the worker level, we can multiply the average treatment of 0.28% (of total assets) with the coefficient estimated in our baseline specification (0.21) to calculate the average effect by worker. This calculation corresponds to an average gain of 0.06 years of employment per worker that we attribute to the loan guarantee program. As the full-time employee equivalent employment at SMEs in 2008 in France was 3.7 million, we obtain an estimate of 217,000 job(-years) preserved over the period 2009-15 ($3.7m \times 0.28 \times 0.21$).

This benefit needs to be compared to the cost of the intervention. The ex ante cost to the

French government was the provision of a €683M fund, which translates into an estimate for the gross cost per job(-year) of around €3200.[7] The ex post cost of the guarantee program can be estimated as the difference between the amount of Bpifrance payments to the banks of defaulting firms, net of commissions. Banks have claimed guarantee payments for an aggregate amount of €333M, and Bpifrance has received commissions for an aggregate amount of €126M. The net cost is therefore €207M, which translates into an estimate for the gross cost per job(-year) around €950.[8]

This cost-per-job is significantly smaller than estimates from the literature on fiscal multipliers in the US (Suárez Serrato and Wingender, 2016; Chodorow-Reich et al., 2012), which place the cost-per-job from government spending closer to $30,000. It is also smaller than estimates from the US loan guarantee program 7.(a) in Brown and Earle (2017), a cost-per-job of around $25,000 (over three years). Closest to our estimate, Cahuc et al. (2018a) find a gross cost per job-year of around €8,000 for hiring credits implemented during the same period in France. While these numbers are not directly comparable, our analysis suggests that loan guarantee programs for short-term debt might be a cost-effective form of stimulus.

The gross cost per job(-year) we calculate ignores the savings in unemployment benefits and social benefits, as well as the avoided reduction in social contributions resulting from the loan guarantee program. We can easily adjust for the savings in unemployment benefits that we estimate in section 4.

Using a discount rate of 10%, and the average treatment associated with a NPV of unemployment benefits of 1.6% of 2008 annual earnings, the savings amount to €350 per worker on average.[9] When applied to the existing 3.7 millions jobs in SMEs in 2008, we

[7]Following Lucas (2012), one can alternatively value the ex ante cost of the program as a put option using derivative pricing methods. Assuming a risk-free rate of 3.5%, time to maturity of 2 years, volatility of 40%, the Black-Scholes value of a 70% guarantee on €5.3bn loans is €640M.

[8]These cost estimates do not account for potential distortions associated with raising the taxes used to finance the program nor do they account for potential increases in the operating cost of the Bpifrance branches due to the program.

[9]We derive the NPV of unemployment benefits from the (yearly difference in the) coefficients presented in Panel D of Table 7, that is $\frac{0.01}{1.1} + \frac{0.005}{1.1^2} + \frac{0.003}{1.1^3} + \frac{0.032}{1.1^4} + \frac{0.024}{1.1^5} + \frac{0.011}{1.1^6} + \frac{-0.001}{1.1^7}$ multiplied by 0.28, the average regional treatment intensity.

obtain an estimate of €1.3 bn savings in unemployment benefits, i.e. almost twice the non-discounted value of the ex post losses on the program. This calculation yields a negative net cost for the program and the jobs it helps preserve.

7 Conclusion

In this article, we use administrative data at the worker level and examine how exposure to a new loan guarantee program implemented in France during the 2008-2009 financial crisis affects the employment and earnings trajectories of workers over the medium run. We find that the guarantees result in a significantly higher likelihood of being employed over the seven years following the intervention, which translates into significantly higher cumulated earnings. Consistent with the idea that the program allows financially-constrained firms to rollover their short-term debt and avoid excessive layoffs, we find a strong effect on employment and earnings trajectories of workers initially employed by financially-constrained firms, but virtually no effect for workers employed by unconstrained firms.

We then turn to the cross-section of workers, and observe that high wage, young workers, and men, benefit more from the intervention, as the effects on cumulative earnings and employment are more pronounced for these sub-groups. However, when decomposing along the adjustment margins, this heterogeneity appears to result mostly from differences in retention decisions by the initial employer rather than differences in labor market frictions in the cross-section of workers. Finally, we perform an aggregate cost-benefit analysis of the loan guarantee program, and estimate the gross cost to preserve a job(-year) to be around €3,200 and a negative net cost when we include the savings on unemployment benefits. Overall, our findings suggest that loan guarantees might be a cost-effective policy for sustaining employment in downturns, in particular in contexts where financial shocks hinder SMEs access to external funds.

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8 Graphs and tables

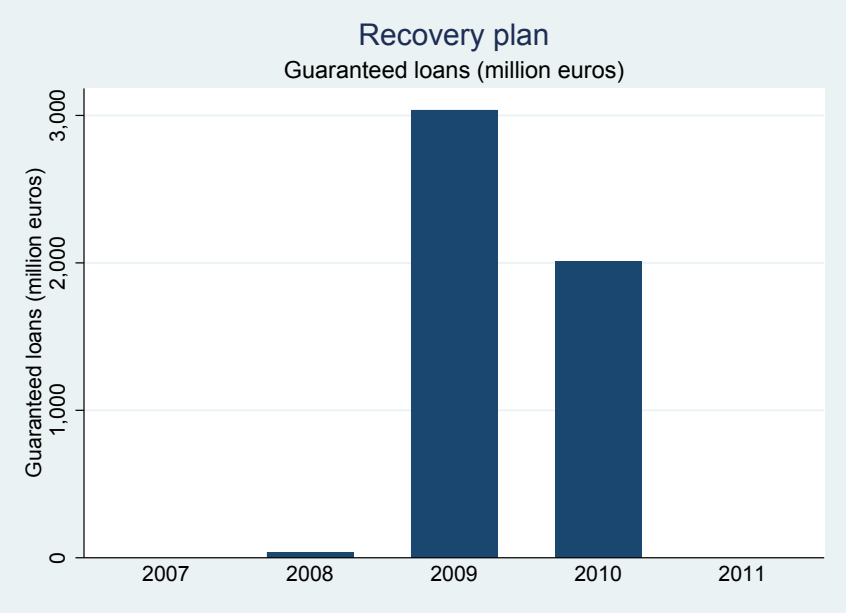

Figure 1
Yearly Volume of Guarantees of the Recovery Plan

Note: This figure displays the total volume of guarantees by Bpifrance as part of the recovery plan.

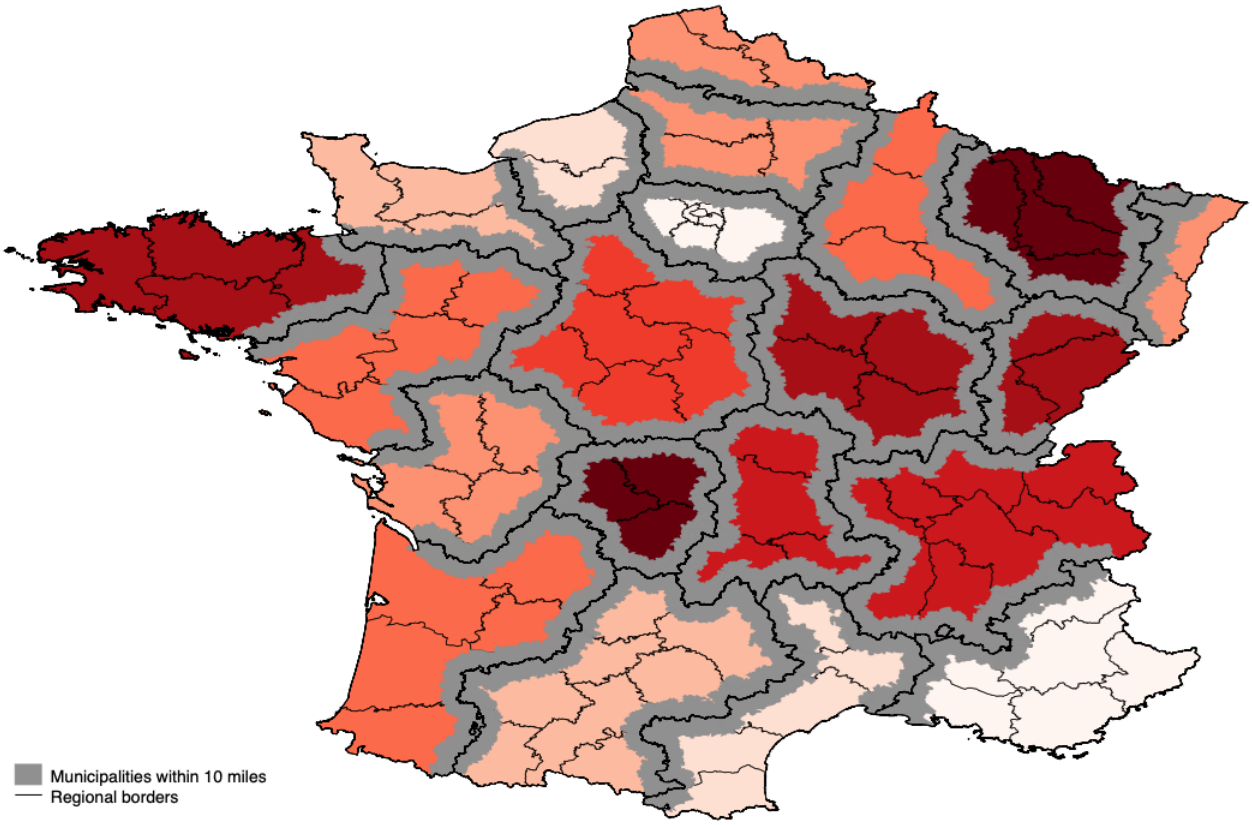

Figure 2
Regional Intensity of Loan Guarantee Intervention

Note: This figure displays the regional intensity of intervention by Bpifrance, as measured by the average firm ratio of the amount of loan guarantees received in 2009-2010 over assets in 2008 across all SMEs in that region. The grey area corresponds to municipalities within 10 miles of a regional border. Thin lines in black represent department boundaries within regions.

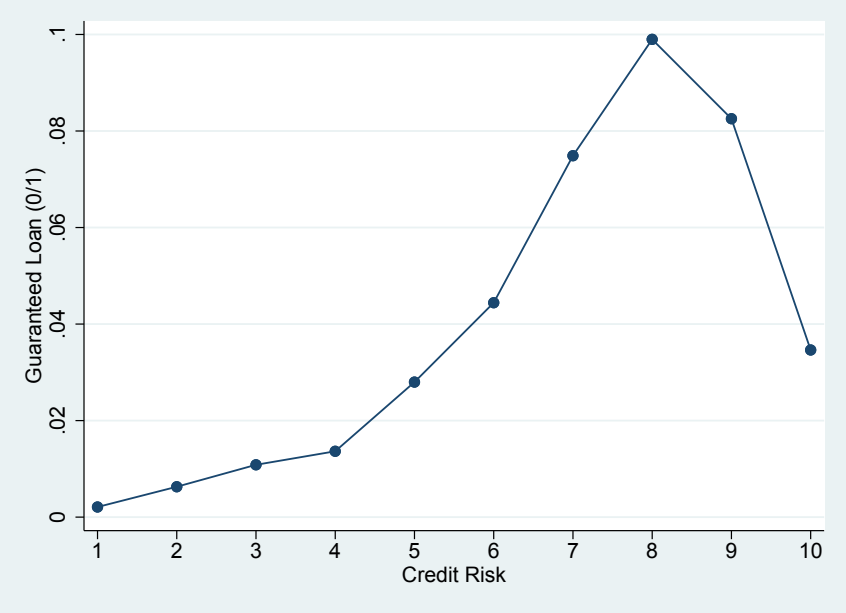

Figure 3
Probability of Loan Guarantee Intervention by Deciles of Credit Risk

Note: For each decile of credit risk, this graph plots the probability of receiving a loan guarantee from BPI. Credit risk is measured as the inverse of the interest coverage ratio. The interest coverage ratio is defined as EBITDA over interest expenses. The sample consists of all firms in our sample of municipalities within 10 miles of a regional border.

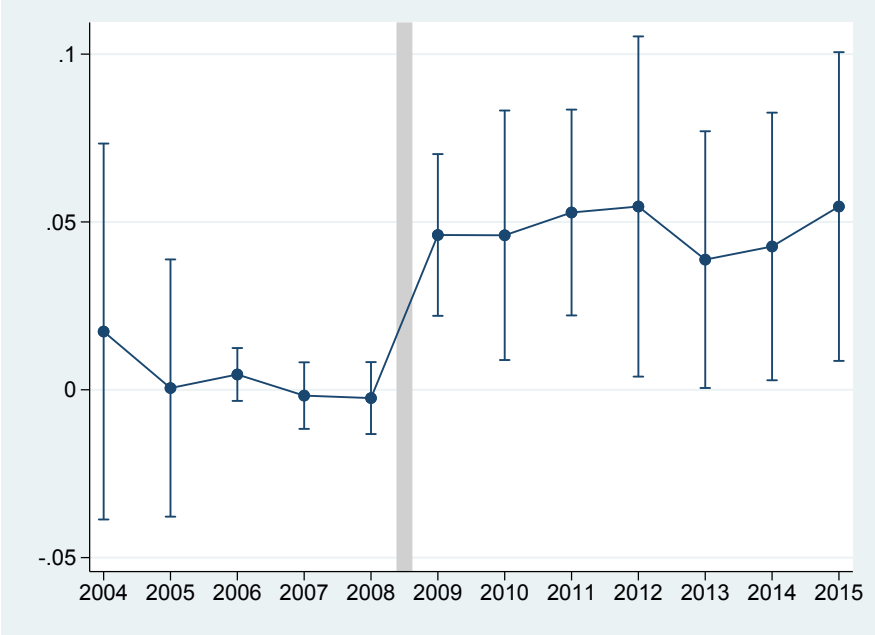

Figure 4
Dynamics: Effect on Earnings

Note: This figure plots regression coefficients and 95% confidence intervals from twelve regressions of earnings that a worker obtains in the year indicated on the x-axis, expressed in percentage points of the worker's average annual earnings in 2006-2008, on our measure of regional exposure to the 2009-2010 loan guarantee program, $\text{Guarantee}_{region,09-10}$. All regressions include department-pair fixed effects, the distance from the regional border, and changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population).

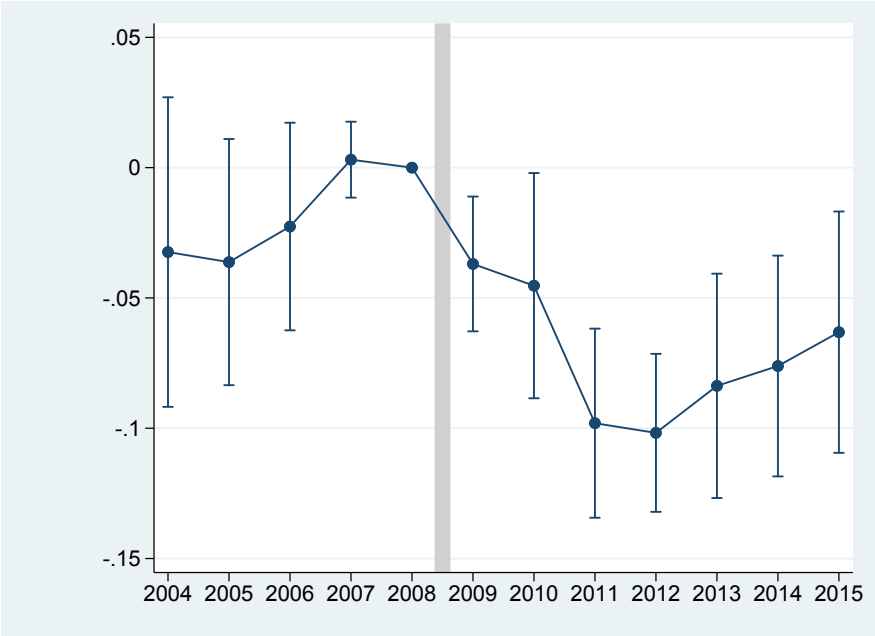

Figure 5
Dynamics: Effect on Separations

Note: This figure plots regression coefficients and 95% confidence intervals from twelve regressions of the likelihood that a worker does not work for the employer in 2008 in the year indicated on the x-axis on our measure of regional exposure to the 2009-2010 loan guarantee program, $\text{Guarantee}_{region,09-10}$. All regressions include department-pair fixed effects, the distance from the regional border, and changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population).

Table 1
Summary Statistics

	(1)	(2)	(3)	(4)	(5)	(6)
	Obs.	Mean	SD	p1	p50	p99
Panel A: Loan guarantee exposure						
$\text{Guarantee}_{region,09-10}$ (over assets in %)	21	0.280	0.156	0.099	0.240	0.759
$\text{Guarantee}_{firm,09-10}$ (over assets in %)	28,587	0.315	1.742	0.000	0.000	12.956
Guarantee (1/0)	28,587	0.040	0.195	0.000	0.000	1.000
$\text{Default Amount}_{firm,09-10}$ (over assets in %)	28587	0.030	0.394	0.000	0.000	0.000
Default on Guaranteed Loan (1/0)	28587	0.009	0.095	0.000	0.000	0.000
Panel B: Main outcome variables, 2009-2015						
$\text{Years Employed}_{2009,2015}$	38,024	6.520	1.284	1.000	7.000	7.000
$\text{Earnings}_{2009,2015}$	38,024	6.507	2.160	0.169	7.090	11.019
$\text{Unemployment Benefits}_{2009,2015}$	38,024	0.216	0.477	0.000	0.000	2.155
Panel C: Worker characteristics in 2008						
Earnings	38,024	23,630	12,816	12,084	20,680	71,540
Hours	38,024	1,868	215	1,150	1,839	2,470
Age	38,024	38	7.7	24	39	51
Panel D: Firm characteristics in 2008						
$\frac{BankDebt}{TotalAssets}_{08}$	27,160	0.152	0.211	0.000	0.069	0.851
$\frac{\Delta_{08-09}BankDebt}{BankDebt_{08}}$	20,789	-0.043	0.255	-0.955	0.000	0.826
Nb Employees	28,587	20.464	29.835	0.000	9.750	163.750
Assets (€'000s)	28,587	3,290	79,462	41	731	30,188
ROA	28,587	0.104	0.192	-0.656	0.100	0.749
Firm Age	28,587	18.042	13.014	1.000	16.000	54.000
Dividend/Sales	28,544	0.016	0.037	0.000	0.000	0.222
PPE/Assets	28,587	0.461	0.333	0.000	0.386	1.000

Note: This table presents summary statistics at the regional and firm level (Panel A), at the worker level (Panel B, C), and firm level (Panel D). The sample includes 1/12th of employees who were working in SMEs located within a 10 miles distance to a regional border in 2008.

Table 2
First Stage

	(1)	(2)	(3)	(4)	(5)	(6)
	Guarantee$_{firm,09-10}$			Guarantee (1/0)		
Guarantee$_{region,09-10}$	0.650***	0.707***	0.701***	0.066***	0.071***	0.069***
	(4.70)	(6.03)	(5.73)	(4.42)	(5.64)	(5.40)
Distance to border	0.000	-0.000	0.001	0.000	0.000	0.000
	(0.01)	(-0.10)	(0.37)	(0.66)	(0.54)	(1.02)
Department-Pair FE	Y	Y	Y	Y	Y	Y
Regional Controls		Y	Y		Y	Y
Firm-level Controls			Y			Y
Observations	28587	28587	28587	28587	28587	28587
R^2	0.009	0.009	0.024	0.009	0.010	0.029

Note: This table reports the results of the first stage OLS regressions. The dependent variable is the amount of guaranteed loans the firm received due to the 2009-2010 recovery plan scaled by 2008 firm assets in columns (1) to (3), and a dummy variable equal to one if the firm received any loan guarantee from the recovery plan in 2009-2010 in columns (4) to (6). The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009-2010 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects. Changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population) are added in columns (2) and (5). Firm-level controls added in columns (3) and (6) include log of assets, log of firm age, and two-digit industry fixed effects. Firm controls are measured in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 3
Balance-Sheet Effects

	(1)	(2)	(3)
	$\frac{\Delta_{08-09} BankDebt}{BankDebt_{08}}$		
$\text{Guarantee}_{region,09}$	0.147**	0.172**	0.180**
	(2.39)	(2.48)	(2.61)
Department-Pair FE	Y	Y	Y
Regional Controls		Y	Y
Firm-level Controls			Y
Observations	19103	19103	19103
R^2	0.006	0.007	0.013

Note: This table reports OLS regression results of the effect of loan guarantees on firms' bank debt. The dependent variable is the change in bank debt from 2008 to 2009, scaled by 2008 bank debt. The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects and distance to the border. Column (2) adds changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population). Column (3) adds firm-level controls (log of assets, log of firm age, and two-digit industry fixed effects). Firm controls are measured in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 4
Employment Effects: Baseline

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Cumulative effects	Years Employed $_{09,15}$				Earnings $_{09,15}$			
Guarantee$_{region,09-10}$	0.233***	0.256***	0.216***	0.214***	0.296***	0.329***	0.238**	0.220**
	(3.13)	(3.14)	(2.97)	(2.87)	(3.51)	(3.54)	(2.65)	(2.29)
Department-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y
Regional Controls		Y	Y	Y		Y	Y	Y
Firm-level Controls			Y	Y			Y	Y
Worker-level Controls				Y				Y
Observations	38024	38024	38024	38024	38024	38024	38024	38024
R^2	0.006	0.006	0.028	0.035	0.007	0.007	0.042	0.053
Panel B: In 2015	Employed $_{15}$				Earnings $_{15}$			
Guarantee$_{region,09-10}$	0.042**	0.044***	0.033**	0.032**	0.059**	0.055**	0.033	0.027
	(2.82)	(2.87)	(2.22)	(2.09)	(2.81)	(2.48)	(1.49)	(1.19)
Department-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y
Regional Controls		Y	Y	Y		Y	Y	Y
Firm-level Controls			Y	Y			Y	Y
Worker-level Controls				Y				Y
Observations	38024	38024	38024	38024	38024	38024	38024	38024
R^2	0.007	0.007	0.035	0.038	0.006	0.006	0.038	0.052

Note: This table reports reduced-form OLS regression results of the effect of loan guarantees on worker-level outcomes. Panel A presents the cumulative effects on years employed and earnings 2009-2015. Cumulative earnings are the sum of earnings 2009-2015 scaled by average annual earnings 2006-2008. Panel B presents the effects on employment and earnings in 2015. The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009-2010 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects and distance to the border. Columns (2) and (6) add changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population). Firm-level controls added in columns (3) and (7) include log of assets, log of firm age, and two-digit industry fixed effects. Worker-level controls added in columns (4) and (8) include worker age, gender, and occupation fixed effects. Firm and worker controls are measured in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 5
Separation

	(1)	(2)	(3)	(4)
	Separation			
$\text{Guarantee}_{region,09-10}$	-0.058**	-0.077***	-0.050**	-0.056**
	(-2.19)	(-3.36)	(-2.21)	(-2.48)
Department-Pair FE	Y	Y	Y	Y
Regional Controls		Y	Y	Y
Firm-level Controls			Y	Y
Worker-level Controls				Y
Observations	38024	38024	38024	38024
R^2	0.010	0.011	0.050	0.063

Note: This table reports reduced-form OLS regression results of the effect of loan guarantees on workers' likelihood to separate from the initial employer. The dependent variable is a dummy equal to one if the worker did not work the entire period from 2009-2015 at the initial firm in 2008. The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects and distance to the border. Column (2) adds changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population). Column (3) adds firm-level controls (log of assets, log of firm age, and two-digit industry fixed effects). Column (4) adds worker-level controls (worker age, gender, and occupation fixed effects). Firm and worker controls are measured in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 6
Unemployment Insurance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Years with UB $_{09,15}$				UB $_{09,15}$			
Guarantee$_{region,09-10}$	-0.197**	-0.249***	-0.230***	-0.239***	-0.065*	-0.085***	-0.078***	-0.080***
	(-2.13)	(-2.90)	(-2.92)	(-3.04)	(-1.85)	(-2.94)	(-3.12)	(-3.11)
Department-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y
Regional Controls		Y	Y	Y		Y	Y	Y
Firm-level Controls			Y	Y			Y	Y
Worker-level Controls				Y				Y
Observations	38024	38024	38024	38024	38024	38024	38024	38024
R^2	0.011	0.011	0.039	0.049	0.012	0.012	0.037	0.046

Note: This table reports reduced-form OLS regression results of the effect of loan guarantees on unemployment benefits. Columns (1) to (4) show the effects on years with positive unemployment benefits. Columns (5) to (8) show the effects on cumulative unemployment benefits. Cumulative unemployment benefits are the sum of unemployment benefits 2009-2015 scaled by average annual earnings 2006-2008. The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009-2010 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects and distance to the border. Columns (2) and (6) add changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population). Firm-level controls added in columns (3) and (7) include log of assets, log of firm age, and two-digit industry fixed effects. Worker-level controls added in columns (4) and (8) include worker age, gender, and occupation fixed effects. Firm and worker controls are measured in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 7
Dynamics

Panel A: Yearly Earnings	04	05	06	07	08	09	10	11	12	13	14	15
$\text{Guarantee}_{region,09-10}$	0.017	0.001	0.005	-0.002	-0.002	0.046***	0.046**	0.053***	0.055**	0.039**	0.043**	0.055**
	(0.65)	(0.03)	(1.21)	(-0.36)	(-0.48)	(3.99)	(2.58)	(3.59)	(2.25)	(2.11)	(2.23)	(2.48)
Department-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Regional Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	38024	38024	38024	38024	38024	38024	38024	38024	38024	38024	38024	38024
R^2	0.010	0.009	0.006	0.006	0.006	0.007	0.006	0.006	0.006	0.006	0.006	0.006
Panel B: Yearly Separations	04	05	06	07	08	09	10	11	12	13	14	15
$\text{Guarantee}_{region,09-10}$	-0.022	-0.028	-0.017	0.004		-0.040***	-0.048**	-0.102***	-0.107***	-0.091***	-0.084***	-0.071***
	(-0.75)	(-1.14)	(-0.89)	(0.50)		(-3.07)	(-2.13)	(-5.31)	(-6.46)	(-3.97)	(-3.71)	(-3.02)
Department-Pair FE	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y
Regional Controls	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y
Observations	38024	38024	38024	38024		38024	38024	38024	38024	38024	38024	38024
R^2	0.010	0.008	0.008	0.005		0.007	0.009	0.011	0.011	0.010	0.011	0.011
Panel C: Cum. Earnings						09	10	11	12	13	14	15
$\text{Guarantee}_{region,09-10}$						0.046***	0.090***	0.140***	0.195***	0.234***	0.276***	0.329***
						(3.99)	(3.35)	(4.64)	(4.32)	(3.84)	(3.67)	(3.54)
Department-Pair FE						Y	Y	Y	Y	Y	Y	Y
Regional Controls						Y	Y	Y	Y	Y	Y	Y
Observations						38024	38024	38024	38024	38024	38024	38024
R^2						0.007	0.007	0.007	0.007	0.007	0.007	0.007
Panel D: Cum. Unemployment Insurance						09	10	11	12	13	14	15
$\text{Guarantee}_{region,09-10}$						-0.011***	-0.016**	-0.019**	-0.051***	-0.075***	-0.086***	-0.085***
						(-5.20)	(-2.37)	(-2.49)	(-4.88)	(-4.97)	(-3.82)	(-2.94)
Department-Pair FE						Y	Y	Y	Y	Y	Y	Y
Regional Controls						Y	Y	Y	Y	Y	Y	Y
Observations						38024	38024	38024	38024	38024	38024	38024
R^2						0.006	0.007	0.007	0.011	0.012	0.012	0.012

Note: This table reports the effect of loan guarantees on earnings, separations, and unemployment benefits by year. Panel A reports yearly earnings, Panel B yearly separations from the initial employer in 2008, Panel C cumulative earnings, and Panel D cumulative unemployment benefits. Earnings and unemployment benefits are scaled by average earnings in 2006-2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 8
Firm Heterogeneity: Financial Constraints

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Panel A: Years Employed $_{09,15}$								
	Cash-Flows			Dividends			Tangibility		
	Low	High	Diff	No Div	Div> 0	Diff	Low	High	Diff
Guarantee$_{region,09-10}$	0.414***	0.010	0.403***	0.271***	0.077	0.194	0.349**	0.120	0.230
	(4.57)	(0.11)	(3.80)	(3.02)	(0.81)	(1.58)	(2.62)	(1.39)	(1.55)
Department-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Regional Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm-level Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Worker-level Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	18885	18884	37769	24037	13981	38018	18890	18872	37762
R^2	0.037	0.049	0.043	0.038	0.037	0.042	0.042	0.042	0.042
	Panel B: Cumulative Earnings $_{2009,2015}$								
	Cash-Flows			Dividends			Tangibility		
	Low	High	Diff	No Div	Div> 0	Diff	Low	High	Diff
Guarantee$_{region,09-10}$	0.527***	-0.017	0.543**	0.331**	-0.023	0.354*	0.314*	0.106	0.207
	(3.90)	(-0.10)	(2.45)	(2.81)	(-0.16)	(1.88)	(1.99)	(0.98)	(1.10)
Department-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Regional Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm-level Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Worker-level Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	18885	18884	37769	24037	13981	38018	18890	18872	37762
R^2	0.072	0.063	0.070	0.054	0.053	0.063	0.060	0.066	0.063

Note: This table reports the effect of loan guarantees on worker employment and earnings trajectories for sub-samples along proxies for financial constraints. Panel A presents the effects on years employed and Panel B on cumulative earnings 2009-2015. Cumulative earnings are the sum of earnings 2009-2015 scaled by average annual earnings 2006-2008. Column (1) and (2) show the results for sub-samples of firms below and above the median firm profitability (profit scaled by assets) in 2008, respectively. Column (3) and (4) split the full sample based on a dummy variable equal to one if the firm paid dividends in 2008. Column (5) and (6) show the results for sub-samples of firms below and above the median firm tangibility, respectively. The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009-2010 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects, distance to the border, changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population), firm (log of assets, log of firm age, and two-digit industry fixed effects), and worker controls (worker age, gender, and occupation fixed effects). Firm and worker controls are measured in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 9
Adjustment Margins

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(N=38,024)	all firms	initial firm	other firm	other firm same CZ	other firm other CZ	other firm same industry	other firm other industry
Years employed	0.256***	0.543***	-0.288**	-0.035	-0.252*	-0.339***	0.051
	(3.14)	(4.66)	(-2.51)	(-0.34)	(-1.88)	(-4.82)	(0.57)
Cumulative earnings	0.329***	0.531***	-0.203	0.050	-0.253**	-0.203**	0.001
	(3.54)	(4.00)	(-1.64)	(0.49)	(-2.52)	(-2.68)	(0.01)

Note: This table reports the effect of loan guarantees on employment and earnings at the initial firm and at other firms. Cumulative earnings are the sum of earnings 2009-2015 scaled by average annual earnings 2006-2008. Column (1) shows the effect across all firms. Column (2) measures employment and earnings at the initial firm (in 2008). Column (3) measures employment and earnings at other firms. Column (4) measures employment and earnings at other firms which are located in the same commuting zone (CZ) as the initial firm. Column (5) measures employment and earnings at other firms which are located in a different CZ than the initial firm. Column (6) measures employment and earnings at other firms in the same two-digit industry as the initial firm. Column (7) measures employment and earnings at other firms in different two-digit industries than the initial firm. The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009-2010 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects, distance to the border, and changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population). Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 10
Heterogeneous Effects across Workers

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Wages						
	Low		High		*Diff*	
	all firms	initial firm	all firms	initial firm	all firms	initial firm
Years employed	0.201**	0.411*	0.312***	0.746***	0.112	0.335
	(2.09)	(2.05)	(2.89)	(4.77)	(0.91)	(1.27)
Cumulative earnings	0.148	0.328	0.570***	0.849***	0.422*	0.521
	(1.20)	(1.53)	(3.54)	(4.09)	(1.98)	(1.66)
Panel B: Age						
	Old		Young		*Diff*	
	all firms	initial firm	all firms	initial firm	all firms	initial firm
Years employed	0.133	0.471**	0.371***	0.695***	0.238***	0.224
	(1.65)	(2.65)	(3.85)	(5.01)	(2.88)	(1.03)
Cumulative earnings	0.067	0.286	0.524***	0.820***	0.457**	0.534**
	(0.76)	(1.58)	(3.43)	(5.28)	(2.73)	(2.55)
Panel C: Gender						
	Women		Men		*Diff*	
	all firms	initial firm	all firms	initial firm	all firms	initial firm
Years employed	0.221**	0.212	0.290***	0.699***	0.069	0.487*
	(2.66)	(0.96)	(2.93)	(4.91)	(0.65)	(1.83)
Cumulative earnings	0.036	-0.021	0.480***	0.791***	0.443**	0.813**
	(0.27)	(-0.08)	(3.55)	(4.64)	(2.13)	(2.46)

Note: This table reports the effect of loan guarantees on employment and earnings at all firms and at the initial firm for sub-groups of workers. See table 9 for detailed descriptions. Low (high) is a dummy equal to one for workers with below (above) median earnings in 2008. Young (old) is a dummy equal to one for workers aged 22-39 (40-51) in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 11
Heterogeneous Effects across Workers - Effect in 2015

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Wages								
Low			High			*Diff*		
Emp $_{15}$	Hours$_{15}$	Earnings $_{15}$	Emp $_{15}$	Hours$_{15}$	Earnings $_{15}$	Emp $_{15}$	Hours$_{15}$	Earnings $_{15}$
0.026	0.021	-0.015	0.063**	0.130***	0.134***	0.037	0.110**	0.149***
(1.38)	(0.64)	(-0.55)	(2.13)	(3.63)	(3.58)	(0.99)	(2.26)	(3.14)
Panel B: Age								
Old			Young			*Diff*		
Emp $_{15}$	Hours$_{15}$	Earnings $_{15}$	Emp $_{15}$	Hours$_{15}$	Earnings $_{15}$	Emp $_{15}$	Hours$_{15}$	Earnings $_{15}$
0.026	0.056	-0.004	0.059***	0.085**	0.089***	0.032	0.029	0.093**
(1.23)	(1.71)	(-0.13)	(3.33)	(2.50)	(2.89)	(1.29)	(0.61)	(2.17)
Panel C: Gender								
Women			Men			*Diff*		
Emp $_{15}$	Hours$_{15}$	Earnings $_{15}$	Emp $_{15}$	Hours$_{15}$	Earnings $_{15}$	Emp $_{15}$	Hours$_{15}$	Earnings $_{15}$
0.004	-0.033	-0.035	0.065***	0.113***	0.097***	0.062**	0.145***	0.132**
(0.20)	(-0.97)	(-1.03)	(3.50)	(4.26)	(3.08)	(2.47)	(3.78)	(2.66)

Note: This table reports the effect of loan guarantees on employment and earnings in 2015 for subgroups of workers. Low (high) is a dummy equal to one for workers with below (above) median earnings in 2008. Young (old) is a dummy equal to one for workers aged 22-39 (40-51) in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 12
Initial Credit Risk of Firms Receiving Loan Guaranteed by BPI

	(1)	(2)	(3)	(4)	(5)	(6)
	Firm Credit Risk$_{08}$					
	Sample of firms receiving BPI loan guarantee			All firms $\leq$ 10 miles		
Guarantee$_{region,09-10}$	1.396***	1.208***	1.093**	0.159	0.115	0.189
	(3.51)	(2.96)	(2.61)	(0.68)	(0.66)	(0.99)
Department-Pair FE	Y	Y	Y	Y	Y	Y
Regional Controls		Y	Y		Y	Y
Firm-level Controls			Y			Y
Observations	1115	1115	1115	26282	26282	26282
r2	0.095	0.098	0.163	0.006	0.007	0.056

Note: This table shows the results of regressing firms' initial credit risk in 2008 on the regional treatment intensity. The dependent variable is a firm's decile of credit risk, measured as the inverse of the interest coverage ratio in 2008. The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009-2010 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects and distance to the border. Changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population) are added in columns (2) and (5). Firm-level controls added in columns (3) and (6) include log of assets, log of firm age, and two-digit industry fixed effects. Firm controls are measured in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 13
A Barrier to Efficient Worker Allocation?

	(1)	(2)	(3)	(4)	(5)	(6)
	Adjustment margin: other firms by firm type					
	Cash-Flows		Firm Size		Firm Creation	
	High	Low	Big	Small	New	Existing
Cumulative earnings	-0.011	-0.227*	-0.075	-0.163	-0.076	-0.162
	(-0.09)	(-1.92)	(-0.56)	(-1.51)	(-0.80)	(-1.24)
Years employed	-0.038	-0.243*	-0.107	-0.184	-0.060	-0.206
	(-0.31)	(-1.89)	(-0.84)	(-1.56)	(-0.59)	(-1.69)

Note: This table reports the effect of loan guarantees on employment and earnings at other firms for sub-groups of workers. Columns (1) and (2) show worker outcomes at firms with profitability above and below the initial firm in 2008. Columns (3) and (4) show worker outcomes at firms larger and smaller than the initial firm. Columns (5) and (6) show worker outcomes at firms created after 2008 and existing firms in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Online Appendix

A DATA ACCESS

The French employment registers (DADS) and the fiscal data (FICUS-FARE), used in this paper, can be accessed by researchers. Authorization must be obtained from the *comité du secret*. The procedure is described at https://www.comite-du-secret.fr. Then researchers use a remote secure server (CASD) to work on the data. The "BPI files" that contain information on the firms receiving guarantees, is produced and owned by the Banque Publique d'Investissement.

B Tables

Table A.1
Summary Statistics - Below versus Above 10 miles

	Our Sample			SMEs $\geq$ 10 miles			Equality Test
	Obs.	Mean	SD	Obs.	Mean	SD	P-value
Panel A: Firm Sample							
Guarantee$_{firm,09-10}$ (over assets in %)	28587	0.315	1.742	117062	0.252	1.524	-6.063
Default Amount$_{firm,09-10}$ (over assets in %)	28587	0.030	0.394	117062	0.027	0.385	-0.862
Guarantee (1/0)	28587	0.040	0.195	117062	0.032	0.176	-6.290
Default on Guaranteed Loan (1/0)	28587	0.009	0.095	117062	0.008	0.090	-1.500
$\frac{BankDebt}{TotalAssets_{08}}$	27160	0.152	0.211	110825	0.156	2.310	0.315
$\frac{\Delta_{08-09}BankDebt}{BankDebt_{08}}$	19103	-0.077	0.840	76169	-0.084	0.888	-0.948
Nb Employees	28587	20.464	29.835	117062	20.035	29.668	-2.188
Assets (€'000s)	28587	3.290	79.462	117062	4.089	100.369	1.252
ROA	28587	0.104	0.192	117062	0.100	0.206	-3.351
Firm Age	28587	18.546	15.243	117062	17.616	15.589	-9.080
Dividend/Sales	28544	0.016	0.037	116781	0.018	0.042	6.853
PPE/Assets	28586	0.461	0.333	117046	0.393	0.327	-31.357
Panel B: Worker Sample							
Years Employed$_{2009,2015}$	38024	6.520	1.284	146256	6.474	1.344	-6.058
Earnings$_{2009,2015}$	38024	6.507	2.160	146256	6.510	2.287	0.265
Unemployment Benefits $_{2009,2015}$	38024	0.216	0.477	146256	0.229	0.484	4.444
Earnings 2008	38024	23630	12816	146256	25613	16672	21.588
Hours 2008	38024	1868	215	146256	1861	219	-5.593
Age 2008	38024	38.337	7.752	146256	37.959	7.686	-8.513

Note: This table compares summary statistics at the firm (Panel A) and worker level (Panel B) for employees working in SMEs located within a 10 miles distance to a regional border in 2008 to employees working in SMEs located outside a 10 miles distance to a regional border in 2008.

Table A.2
Summary Statistics - No BPI loans vs Treated

	No BPI loans			Treated			Equality Test
	Obs.	Mean	SD	Obs.	Mean	SD	P-value
Panel A: Firm Sample							
$\text{Guarantee}_{firm,09-10}$ (over assets in %)	27454	0.000	0.000	1133	7.938	4.002	328.780
$\text{Default Amount}_{firm,09-10}$ (over assets in %)	27454	0.000	0.000	1133	0.745	1.838	67.226
Default on Guaranteed Loan (1/0)	27454	0.000	0.000	1133	0.230	0.421	90.646
$\frac{BankDebt}{TotalAssets_{08}}$	26069	0.150	0.212	1091	0.194	0.178	6.690
$\frac{\Delta_{08-09}BankDebt}{BankDebt_{08}}$	18227	-0.095	0.832	876	0.298	0.907	13.604
Nb Employees	27454	20.057	29.557	1133	30.319	34.489	11.371
Assets (€'000s)	27454	3,308	81,079	1133	2,850	4,810	-0.190
ROA	27454	0.106	0.193	1133	0.048	0.140	-10.108
Firm Age	27454	18.485	15.215	1133	20.040	15.857	3.366
Dividend/Sales	27413	0.017	0.038	1131	0.006	0.018	-9.241
PPE/Assets	27453	0.460	0.334	1133	0.472	0.320	1.197
Panel B: Worker Sample							
$\text{Years Employed}_{2009,2015}$	36110	6.518	1.288	1914	6.556	1.210	1.254
$\text{Earnings}_{2009,2015}$	36110	6.514	2.164	1914	6.363	2.084	-2.978
Unemployment Benefits $_{2009,2015}$	36110	0.213	0.474	1914	0.280	0.532	6.036
Earnings 2008	36110	23624	12864	1914	23752	11873	0.424
Hours 2008	36110	1868	215	1914	1872	206	0.687
Age 2008	36110	38.320	7.761	1914	38.654	7.574	1.836

Note: This table compares summary statistics at the firm (Panel A) and worker level (Panel B) for SMEs that received no guarantee under the recovery plan to SMEs that received guarantees under the recovery plan. The sample includes SMEs within a 10 miles distance to a regional border in 2008.

Table A.3
Industry Composition

Panel A:	Our Sample		SMEs $\geq$ 10 miles	
Agriculture, forestry and fishing	5	(0.0%)	18	(0.0%)
Mining and quarrying	77	(0.3%)	254	(0.2%)
Manufacturing	7574	(26.5%)	22235	(19.0%)
Electricity, gas, steam and air conditioning supply	12	(0.0%)	62	(0.1%)
Water supply; sewerage, waste management and remediation activities	162	(0.6%)	666	(0.6%)
Construction	4565	(16.0%)	17838	(15.2%)
Wholesale and retail trade; repair of motor vehicles and motorcycles	8210	(28.7%)	33512	(28.6%)
Transportation and storage	1801	(6.3%)	6056	(5.2%)
Accommodation and food service activities	1682	(5.9%)	8106	(6.9%)
Information and communication	282	(1.0%)	3263	(2.8%)
Financial and insurance activities	117	(0.4%)	654	(0.6%)
Real estate activities	427	(1.5%)	2790	(2.4%)
Professional, scientific and technical activities	1537	(5.4%)	10209	(8.7%)
Administrative and support service activities	803	(2.8%)	4766	(4.1%)
Education	197	(0.7%)	1185	(1.0%)
Human health and social work activities	426	(1.5%)	1653	(1.4%)
Arts, entertainment and recreation	212	(0.7%)	1123	(1.0%)
Other service activities	496	(1.7%)	2673	(2.3%)
	28585		117063	

Panel B:	Our Sample			
	No BPI loans		Treated	
Agriculture, forestry and fishing	5	(0.0%)	0	(0.0%)
Mining and quarrying	76	(0.3%)	**	(**%)
Manufacturing	7038	(25.6%)	536	(47.3%)
Electricity, gas, steam and air conditioning supply	12	(0.0%)	0	(0.0%)
Water supply; sewerage, waste management and remediation activities	155	(0.6%)	7	(0.6%)
Construction	4389	(16.0%)	176	(15.5%)
Wholesale and retail trade; repair of motor vehicles and motorcycles	7958	(29.0%)	252	(22.2%)
Transportation and storage	1738	(6.3%)	63	(5.6%)
Accommodation and food service activities	1661	(6.1%)	21	(1.9%)
Information and communication	277	(1.0%)	**	(**%)
Financial and insurance activities	115	(0.4%)	**	(**%)
Real estate activities	425	(1.5%)	**	(**%)
Professional, scientific and technical activities	1500	(5.5%)	37	(3.3%)
Administrative and support service activities	784	(2.9%)	19	(1.7%)
Education	196	(0.7%)	**	(**%)
Human health and social work activities	423	(1.5%)	**	(**%)
Arts, entertainment and recreation	207	(0.8%)	**	(**%)
Other service activities	493	(1.8%)	**	(**%)
	27452		1133	

Note: This table presents the industry composition of SMEs. Panel A compares SMEs located within a 10 miles distance to a regional border in 2008 to SMEs located outside a 10 miles distance to a regional border in 2008. Panel B compares SMEs that received no guarantee under the recovery plan to SMEs that received guarantees under the recovery plan in our sample of SMEs within a 10 miles distance to a regional border in 2008.

Table A.4
Placebo Analysis: Effects Before the Reform?

Panel A : Worker Characteristics	Ln(Wage)_{08}	Ln(Hours)_{08}	Ln(UI)_{08}
$\text{Guarantee}_{region,09-10}$	-0.032	-0.001	0.021
	(-1.28)	(-0.16)	(0.44)
Department-Pair FE	Y	Y	Y
Regional Controls	Y	Y	Y
Observations	38024	38024	38024
R^2	0.045	0.008	0.005
Panel B : Firm Characteristics	Ln(FirmAge)_{08}	Ln(FirmSize)_{08}	$\text{EBITDA/Assets}_{08}$
$\text{Guarantee}_{region,09-10}$	0.066	0.249	0.006
	(1.24)	(1.70)	(0.77)
Department-Pair FE	Y	Y	Y
Regional Controls	Y	Y	Y
Observations	28587	28587	28587
R^2	0.012	0.012	0.007

Note: This table reports OLS regressions of worker and firm characteristics in 2008 on loan guarantees under the recovery plan in 2009-2010. The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009-2010 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects, distance to the border, and changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population). Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table A.5
First Stage: Worker Level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Guarantee$_{firm,09-10}$				Guarantee (1/0)			
Guarantee$_{region,09-10}$	0.681**	0.739***	0.706***	0.703***	0.062**	0.069**	0.062**	0.061**
	(2.63)	(3.09)	(3.11)	(3.07)	(2.20)	(2.46)	(2.38)	(2.36)
Distance to border	-0.006	-0.007	-0.002	-0.002	-0.000	-0.000	0.000	0.000
	(-0.83)	(-0.90)	(-0.36)	(-0.36)	(-0.11)	(-0.21)	(0.55)	(0.54)
Department-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y
Regional Controls		Y	Y	Y		Y	Y	Y
Firm-level Controls			Y	Y			Y	Y
Worker-level Controls				Y				Y
Observations	38024	38024	38024	38024	38024	38024	38024	38024
R^2	0.015	0.015	0.034	0.034	0.017	0.017	0.041	0.041

Note: This table reports the results of the first stage OLS regressions at the worker level. The dependent variable is the amount of guaranteed loans the firm received due to the 2009-2010 recovery plan scaled by 2008 firm assets in columns (1) to (4), and a dummy variable equal to one if the firm received any loan guarantee from the recovery plan in 2009-2010 in columns (5) to (8). The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009-2010 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects and distance to the border. Changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population) are added in columns (2) and (6). Firm-level controls added in columns (3) and (7) include log of assets, log of firm age, and two-digit industry fixed effects. Worker-level controls added in columns (4) and (8) include worker age, gender, and occupation fixed effects. Firm and worker controls are measured in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table A.6
Employment Effects: Robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Distance <= 5 miles	Years Employed $_{09,15}$				Earnings $_{09,15}$			
Guarantee$_{region,09-10}$	0.206**	0.233**	0.262***	0.263***	0.323**	0.248*	0.276**	0.265*
	(2.20)	(2.35)	(2.95)	(2.92)	(2.69)	(1.79)	(2.30)	(2.07)
Department-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y
Regional Controls		Y	Y	Y		Y	Y	Y
Firm-level Controls			Y	Y			Y	Y
Worker-level Controls				Y				Y
Observations	18680	18680	18680	18680	18680	18680	18680	18680
R^2	0.011	0.012	0.038	0.046	0.010	0.010	0.049	0.060
Panel B: Excluding Regional Pairs with Ile-de-France	Years Employed $_{09,15}$				Earnings $_{09,15}$			
Guarantee$_{region,09-10}$	0.249**	0.272***	0.275***	0.268***	0.257**	0.305**	0.312**	0.306**
	(2.90)	(2.99)	(3.21)	(3.04)	(2.61)	(2.83)	(2.75)	(2.40)
Department-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y
Regional Controls		Y	Y	Y		Y	Y	Y
Firm-level Controls			Y	Y			Y	Y
Worker-level Controls				Y				Y
Observations	24851	24851	24851	24851	24851	24851	24851	24851
R^2	0.008	0.008	0.031	0.037	0.008	0.008	0.045	0.056
Panel C: Excluding Non-Tradable Industries	Years Employed $_{09,15}$				Earnings $_{09,15}$			
Guarantee$_{region,09-10}$	0.253***	0.274***	0.227**	0.207**	0.496***	0.495***	0.388**	0.333*
	(3.33)	(3.03)	(2.37)	(2.17)	(4.09)	(3.47)	(2.44)	(2.04)
Department-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y
Regional Controls		Y	Y	Y		Y	Y	Y
Firm-level Controls			Y	Y			Y	Y
Worker-level Controls				Y				Y
Observations	17200	17200	17200	17200	17200	17200	17200	17200
R^2	0.009	0.009	0.025	0.032	0.012	0.013	0.047	0.063

Note: This table reports robustness tests for the baseline results. See table 4 for detailed descriptions.

Table A.7
Hours

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Hours Worked $_{09,15}$				Hours $_{15}$			
Guarantee$_{region,09-10}$ Treatment	0.393***	0.454***	0.381***	0.390***	0.065***	0.065***	0.049***	0.049**
	(4.37)	(5.28)	(4.94)	(4.80)	(3.74)	(3.73)	(2.92)	(2.81)
Department-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y
Regional Controls		Y	Y	Y		Y	Y	Y
Firm-level Controls			Y	Y			Y	Y
Worker-level Controls				Y				Y
Observations	38021	38021	38021	38021	38021	38021	38021	38021
R^2	0.009	0.009	0.041	0.044	0.007	0.007	0.035	0.038

Note: This table reports reduced-form OLS regression results of the effect of loan guarantees on hours worked. Columns (1) to (4) show the cumulative effects on hours worked 2009-2015. Cumulative hours worked are the sum of hours 2009-2015 scaled by average annual hours worked 2006-2008. Columns (5) to (8) present the effects on hours worked in 2015. The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009-2010 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects and distance to the border. Column (2) and (6) add changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population). Firm-level controls added in columns (3) and (7) include log of assets, log of firm age, and two-digit industry fixed effects. Worker-level controls added in columns (4) and (8) include worker age, gender, and occupation fixed effects. Firm and worker controls are measured in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table A.8
Firm Heterogeneity: First Stage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Guarantee$_{firm,09-10}$								
	Cash-Flows			Dividends			Tangibility		
	Low	High	Diff	No Div	Div> 0	Diff	Low	High	Diff
Guarantee$_{region,09-10}$ Treatment	1.276***	-0.095	1.372***	1.115***	0.180	0.935**	0.720**	0.536**	0.184
	(4.72)	(-0.27)	(3.30)	(2.95)	(1.36)	(2.70)	(2.10)	(2.59)	(0.53)
Department-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Regional Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm-level Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Worker-level Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	24037	13981	38018	18885	18884	37769	18890	18872	37762
R^2	0.042	0.061	0.049	0.053	0.044	0.056	0.046	0.052	0.049

Note: This table reports first stage OLS regression results for sub-samples along proxies for financial constraints. The dependent variable is the amount of loans a firm received under the recovery plan 2009-2010, scaled by firm assets in 2008. Column (1) and (2) show the results for sub-samples of firms below and above the median firm profitability (profit scaled by assets) in 2008, respectively. Column (3) and (4) split the full sample based on a dummy variable equal to one if the firm paid dividends in 2008. Column (5) and (6) show the results for sub-samples of firms below and above the median firm tangibility, respectively. The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009-2010 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects, distance to the border, changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population), firm (log of assets, log of firm age, and two-digit industry fixed effects), and worker controls (worker age, gender, and occupation fixed effects). Firm and worker controls are measured in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.